Diazir™ Full Contour Zirconia

Precision milled full contour zirconia for outstanding marginal fit.

ivoclar vivadent | precision ceramics

Diadem Precision Technology

Diazir™ Full Contour Zirconia

Precision milled full contour zirconia for outstanding marginal fit.

Zirconia Material Science

Zirconia Overview

Zirconium dioxide (ZrO_2), also known as zirconia, is a white crystalline oxide of the metal element zirconium (Figure 1). Its most naturally occurring form is the rare mineral baddeleyite though zirconium metal used for dentistry is obtained from the zirconium-containing mineral ore called zircon. After being processed and purified these powders can be further processed to produce somewhat porous bodies that can be CAD/CAM milled with great precision. Once densely sintered, a polycrystalline ceramic material is produced which, unlike most other dental ceramics, contains no glass phase.

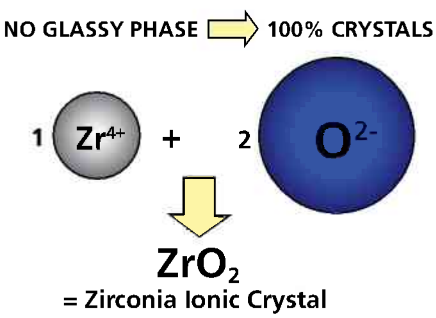


Figure 1

Zirconium dioxide (ZrO_2, zirconia) has a unique crystallographic property that greatly improves its strength and toughness. Zirconia crystals can have a monoclinic (M), tetragonal (T) or cubic structure depending on temperature (Figure 2). A crystal structure is the spacing of the atoms of zirconium and oxygen and produces a resulting volume. At high temperatures, zirconia has a cubic structure. As the temperature is lowered, the atoms rearrange themselves and the structure becomes tetragonal. Further cooling results in additional rearrangement into a monoclinic structure. The transformation from tetragonal to monoclinic is accompanied by a volume change (Figure 3). The volume change accompanying the tetragonal to monoclinic transformation is what makes zirconia stronger and tougher than aluminum oxide and therefore, unique as a dental structural material for multiple unit posterior bridges. Certain oxides, such as magnesium oxide (MgO), yttrium oxide, (Y_2O_3), calcium oxide (CaO), cerium(III) oxide (Ce_2O_3), and others are added to zirconia to stabilize the tetragonal crystal structure at room temperature. The conversion from the tetragonal phase to the monoclinic then occurs when the material is stressed and a crack starts to propagate. However, because of the volume increase accompanying the T to M transformation, the crack is closed until a much higher stress is applied (Figure 4)

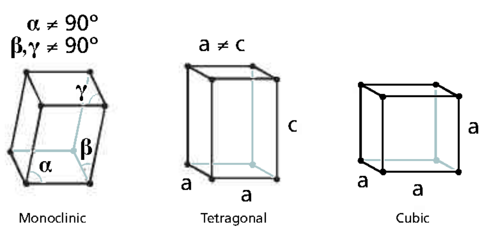


Figure 2

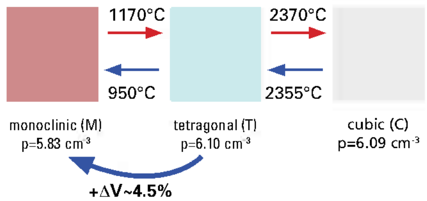


Figure 3

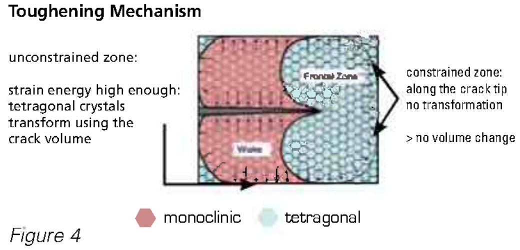


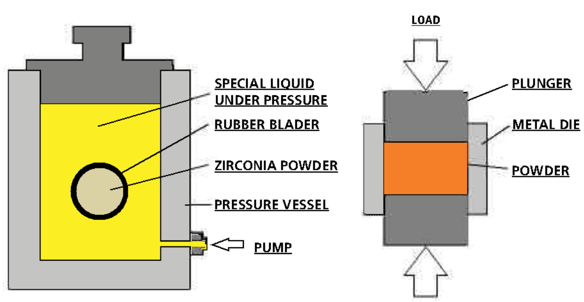
Figure 4

Quality Parameters of Zirconia Powders

The key to a successful zirconia material is the proper microstructure which will optimize the physical and optical properties of the oxide. Such a microstructure is attained only when the powder with the proper chemistry and morphology is properly processed. Zirconium (Zr), for dental zirconia, is obtained from the zirconium-containing mineral ore zircon which is found in deposits located in many parts of the world such as Russia, the United States, and Australia. For this zirconium-containing mineral to become medical-grade quality zirconia, it must be purified using very tightly controlled processes. These processes can include electrolysis, hydrolysis, and various nano technologies. The ideal morphology of the zirconia powder is spherical with particle sizes less than 100 nm in diameter. The shape and distribution of these particles allow the powder to properly pack together and form a controlled and homogenous distribution of powder and space which is essential for precision milling and a quality final zirconia restoration.

Powder Processing and Methods of Shading

Unlike conventional dental porcelain, which is colorized by adding oxides having specific color, zirconia must be shaded differently. Conventional porcelain matures at a temperature between 850ºC and 950ºC. At these relatively low temperatures, the colored oxides retain their shape and chemistry and provide the colors needed to affect the correct shade. However, zirconia is sintered at much higher temperatures: 1450ºC to 1550ºC. At these high temperatures, the colored oxides react with the zirconium oxide and lose their color as well as compromise strength. Therefore, color must be added differently to zirconia. Some manufacturers add it as color centers dissolved in a liquid which is absorbed into the porous zirconia structure before the restoration is sintered. This approach does provide color however it slows down the sintering process, does not always penetrate to the same depth, and often compromises the furnace. Another method to colorize zirconia is to add the dissolved coloring agents to the powder before the powder is pressed and formed into a pre-sintered body to be milled. This approach does not slow down sintering, provides homogenous color and has no detrimental effects to sintering furnace. Using this approach, desired dental shading can be obtained through predetermined combinations of pre-shaded powders. Zirconia powder is formed into the required millable shape by isostatic pressing. This technique applies pressure to the mass equally in all directions (Figure 5a). This results in a controlled distribution of the powder spheres and air. The air is driven off during the high temperature sintering process and the powder shrinks uniformly in all directions (isotropically). Uniaxial pressing applies the load only vertically (Figure 5b). Depending on the size of the sample, the resulting structure is not uniform and therefore may not shrink uniformly and thus cause distortion and poor fit. Because zirconia is difficult to machine in the completely sintered state, it is machined at about 50% of its theoretical density. Properly isostatically pressed micro-spherical zirconia powder is heated to about 1000ºC to burn off the binder and provide a porous, easily machined zirconia block. The material must be strong enough to allow machining of proper margins, but not so strong to ensure machine tools do not prematurely wear. The soft-sintered material can then be machined into an oversized dental restoration.

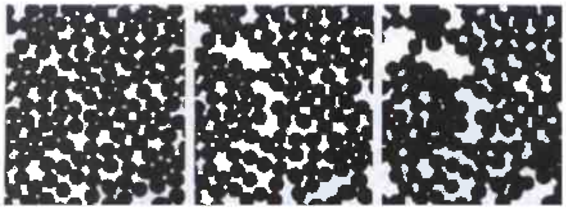


Figures 5a and 5b

Sintering

To transform from a homogeneous powder compact to a quality pre-sintered "soft" state block for precision milling, a proper firing schedule is vital. An appropriate firing schedule, in the range of 1100ºC to burn off binder and start to sinter the particles, will produce a pre-sintered body that will have a homogeneous distribution of zirconia particles with approximately 50% porosity and a pre-sintered strength of 60-100 MPa for precision milling. The heat exchange and the heating velocity control the reorganization of the sintering particles during the pre-sintering stage (Figure 6). A proper firing cycle (Figure 6a) produces a homogeneous spacing and porosity, and is critical in determining final density, any flaws and flaw sizes, and fitting accuracy. If the heat exchange (temperature) (Figure 6b) or heat velocity (heating rate) (Figure 6c) are not optimized then non-homogeneous spacing and porosity are obtained resulting in pores in the final microstructure. A change of even 50ºC can change the pre-sintered porosity and give a different arrangement of the particles which can affect the milling of the pre-sintered zirconia and thus the final restoration (Figures 7a & 7b).

Pre-sintered zirconia is approximately 50% of the final density. This corresponds to a linear shrinkage in the range of 25%. This shrinkage is compensated for during the milling process. A proper sintering schedule produces uniform shrinkage for proper fit and microstructure. The sintering temperature has a greater effect on the final microstructure and the sintering time. The higher the sintering temperature, the faster the pre-sintered zirconia material will densify. Increasing the sintering temperature, though, will increase the mean zirconia crystal size and produce a less uniform size of crystals (Figure 8). Increasing the crystal size can decrease the strength, increase of transforming potential (tetragonal to monoclinic phase), and increase amount of cubic phase. With smaller crystal size though, more grain boundaries, which can scatter light and decrease translucency, are introduced so an optimal sintering schedule is needed to produce the desired ideal combination of optical and mechanical properties.



a) b) c)

Figure 6

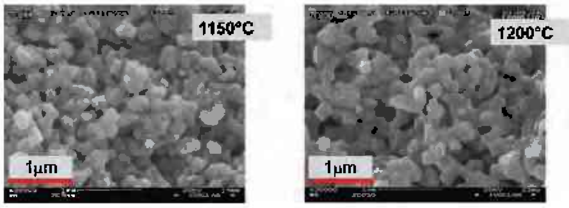


Figure 7a and 7b

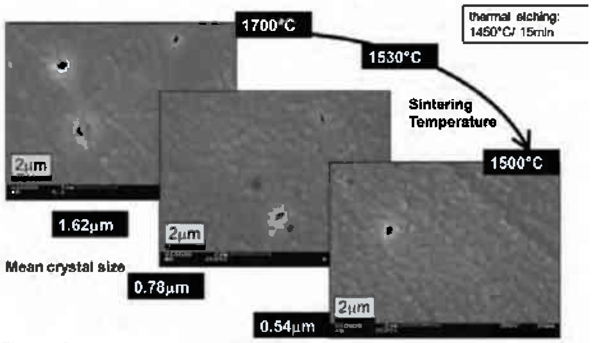


Figure 8

KDA-002956
EXHIBIT 101

Desired Microstructure

Most zirconia sintering schedules in dentistry are in the range of 1500ºC to 1600ºC. The desired final microstructure should have almost no cubic phase and have a density which is in the range of 95.5-100% of the theoretical density of tetragonal zirconia (=6.09 g/cm^3). The microstructure should be less than a 1 µm in diameter and have a fairly uniform crystal size distribution with minimal to no porosity (Figure 9).

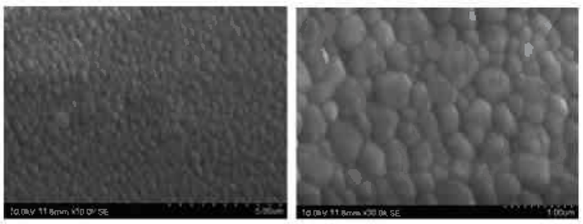


Figure 9

a) Ideal microstructure with uniform from sizes that are smaller than 1µm

b) Larger grains and non-uniform structure creating potential for porosity

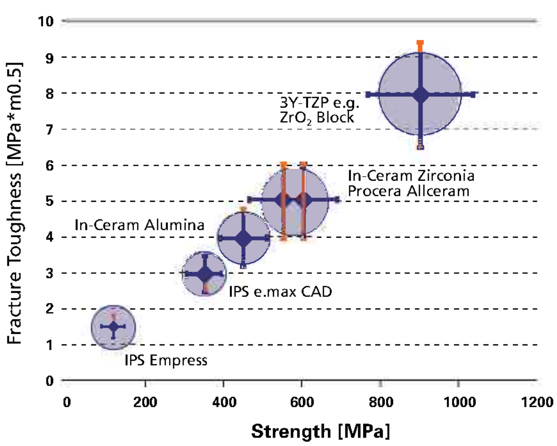


Figure 10

Properties of Diadem Zirconia

Strength and Toughness

The strength and toughness of several ceramics used in dentistry are displayed in Figure 10. As can be seen, zirconia is significantly stronger than any other all-ceramic material. It has constantly produced strengths greater than or equal to 900 MPa and toughness greater than 6 MPa•m$^{1/2}$. Without the need for weaker layering porcelain, full contour zirconia restorations provide more than 900 MPa of strength throughout the restoration, which is a monolithic strength unlike any other ceramic or PFM restoration. As can be seen in Table 1, Diazir Full Contour Zirconia has a minimum strength of 900 MPa for all shades. When compared to some other full contour zirconia on the market, Diazir has strengths that are comparable and can measure up to almost 1200 MPa (Figure 11).

As a result, Diazir Full Contour Zirconia offers many advantageous features to both dentist and patient, including greater resistance to failure than conventional layered metal-based or all-ceramic restorations. Further, even more conservative preparation designs can be used with Diazir Full Contour Zirconia restorations than for any other all-ceramic or PFM restorations. The high strength, excellent optical properties, and incorporation of a simple but effective staining system enable Diazir Full Contour Zirconia restorations to provide a viable alternative to conventional metal and metal-occlusal restorations.

TECHNICAL DATA †	
Coefficient of Thermal Expansion (25-500°C)	10.6×10^{-6}/°C
Flexural Strength:	≥ 900 MPa
Vickers Hardness (HV10):	≥ 1,250
Chemical Solubility:	≤ 1 µg/cm²

† As per ISO 6872:2008

Table 1

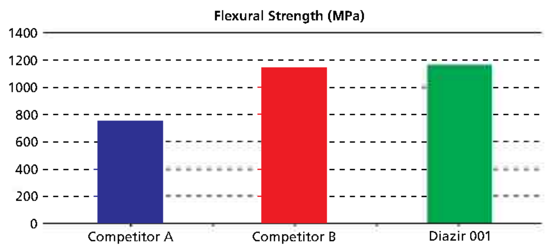


Figure 11

Colored Powders

Diazir Full Contour Zirconia material remains esthetically versatile, in addition to its strength. The Diazir system uses five preshaded high translucency discs which offer several advantages over other full contour zirconia systems that are colored using liquids.

Advantages:

1. It eliminates the need for handling very acidic coloring liquids which can affect the life of the furnace.
2. The Diazir precolored shading system produces a homogenous color in the restoration reducing the probability of white spots that could be caused by adjustments providing more predictable results for the laboratory and dentist. The stains and glaze are applied after sintering.
3. No drying under a heat lamp is needed and less application time for shades and stains, the Diazir processing method can save time over other full contour zirconia systems.

Translucency

Translucency defines the ability of a material to allow light to partially move through the material while also partially reflecting the light. The translucency of zirconia is controlled by several properties of the zirconia including the grain size, distribution of grains, processing method, and additives. Diazir Full Contour Zirconia optimizes the size of the crystals, along with a homogenous distribution of grain sizes, for both excellent strength and minimal grain interfaces which can reflect light and cause increased opacity. To ensure the highest level of translucency and esthetics, Diazir zirconia uses a higher purity of initial zirconia powder with minimal impurities which can allow for a higher relative light transmittance (Figure 12). Unlike previous generations of zirconia materials, Diazir does not require the use of dipping and coloring liquids to obtain its color. These improvements allow Diazir zirconia to increase translucency to above core zirconias, even when colored and in the range of commonly used glass-ceramics (Figure 13).

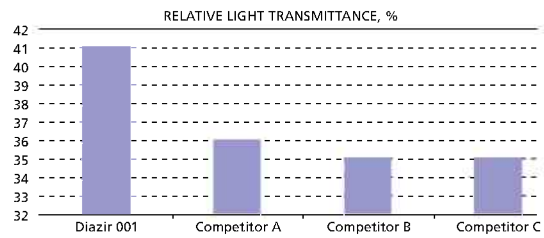


Figure 12

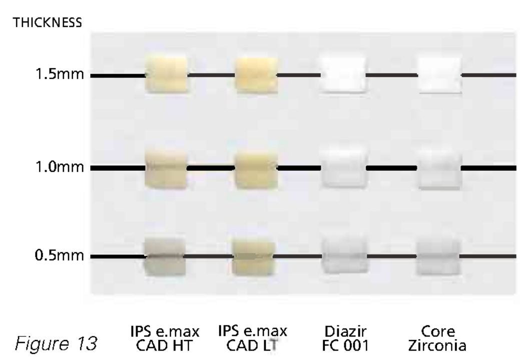


Figure 13

The final shade seen by the eye is a composite of the shade/translucency of the core and selected placement of the dentin stain and incisal stain and characterizers. This is possible because the color and translucency perceived by the eye and the brain of the observer are additive. The base color and translucency of the core provide the beginning of the final shade. The color of the selected dentine stain then can be added to the color of the core. Similarly, the translucency of the core is enhanced by the color of the stains placed on the incisal third of the tooth.

Figure 14

Figure 15

Wear

Adjustment and polishing

One of the primary initial concerns with full contour zirconia was the wear of opposing dentition. Low wear of opposing dentition is critical for all ceramic and PFM restorations. Several studies have recently examined the wear of full contour zirconia. One study, performed by Dr. Burgess, examined the wear of enamel by Diazir Full Contour Zirconia in both the polished and glazed in comparison to a commonly used porcelain and nature enamel. In the study, the antagonist enamel wear shaped out of bicuspid cusps and worn against the materials is shown (Figure 14) and a load of 20N was applied using enamel styli for 400,000 cycles (Figure 15). The wear simulator produces a 4mm slide over the ceramic/enamel specimens after the tooth stylus contacts the specimen. Wear measurements were taken at 200,000 and 400,000 cycles using a non-contact 3D profilometer. In comparison to enamel, glazed zirconia, and porcelain, the polished zirconia demonstrated the least wear on enamel (Figure 16). Although the wear of glazed zirconia was more than the polished zirconia, it still demonstrated a much lower wear than the commonly used porcelain (J. Burgess, University of Alabama at Birmingham, Ivoclar Vivadent Internal Report).

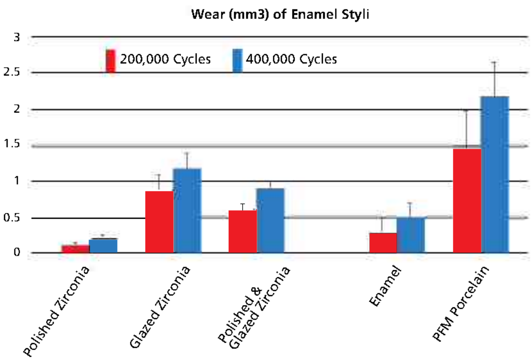


Figure 16

Biocompatibility

The biocompatibility of ceramic materials used intraorally has been tested with a variety of methods. In 2009, Vagkopoulou, Koutayas, Koidis, and Shrub (European Journal of Esthetic Dentistry 4 (2009) 130-151) studied the cytotoxicity of zirconia materials. They concluded: "Both in vitro and in vivo studies have confirmed the superior biocompatibility of high purity Y-TZP powders especially when they are totally purified from radioactive contents. Zirconia ceramics are chemically inert materials and no local or systemic adverse reactions have been reported. In vitro tests showed that zirconia ceramics have a similar cytotoxicity to alumina (both lower than TiO^2). No cytotoxic, oncogenic, or mutagenic effects on fibroblasts or blood cells were observed and no stochastic effect or chromosomal aberrations induced by Y-TZP ceramics doped with 0.5 ppm of UO^2 could be found. The in vivo behavior of Y-TZP compared with alumina did not demonstrate any of the differences regarding tissue reaction." They continued: "The biocompatibility of zirconia has been well documented and in vitro and in vivo tests on Y-TZP have revealed good biocompatibility with no adverse reactions with cells or tissues." Additionally, biocompatibility tests run by an independent toxicology testing center in accordance with ISO 6872 and ISO 10993 guidelines demonstrated that Diazir materials are considered non-cytotoxic (Table 2).

Shade:	FCZ001	FCZ101	FCZ201	FCZ401
Disc Lot # & Nominal Thickness:	N44585 (20 mm)	G28103 (20 mm)	G28106 (20 mm)	N48128 (12 mm)
Cytotoxicity:	Non-Cytotoxic Toxikon report 10-3697-G1	Non-Cytotoxic Toxikon report 10-3711-G1	Non-Cytotoxic Toxikon report 10-3710-G1	Non-Cytotoxic Toxikon report 10-3483-G1
Solubility (µg/cm):	0.1	not tested	0.3	0.5

§Tested per ISO10993 5 guidelines
‡Tested per ISO6872:2008 {} indicate bulk shade lot #'s from which solubility specimens were pressed and sintered

Table 2

Fit and Knife Edge

The shrinkage of zirconia aids in the fit of the restoration. With Diadem precision milling and the Diazir zirconia uniform and homogenous shrinkage, excellent fits, not only at the margins but the entire internal fit, can be obtained (Figure 17). Since zirconia is milled in an oversized state to account for shrinkage, the bur path accommodations are factored in to precision of the milling. As the zirconia is sintered, any milling error that may be incorporated is also reduced. Also, since the pre-sintered state is less hard than other ceramic materials, it can be milled with less pressure and greater ease. Diazir Full Contour Zirconia also offers many other advantages to both dentist and patient, such as the ability to produce knife edge preparation design due to its excellent toughness and strength and ease of milling (Figure 18). Further, the same conservative preparation designs used for other all-ceramic materials can be used with Diazir Full Contour Zirconia restorations. There are no new preparation techniques to learn, so dentists can be familiar and comfortable with this type of restoration.

Figure 17

Figure 18

FC Glaze

FC glaze is a high fusion, low solubility, wear resistant glaze due to its fine leucite content. The solubility FC glaze has been measured to be 11 mg/cm^2 using ISO6872 which has a solubility limit of 100 mg/cm^2. This fine leucite (about 1 micron in size) gives the glaze very low wear as has been measured by Dr. Suzuki for similar materials compromising the same fine leuctie. As can be seen below (Figure 19), the glaze forms an excellent interface with full contour zirconia and can even be applied to a fine polished surface with no separation or movement during firing.

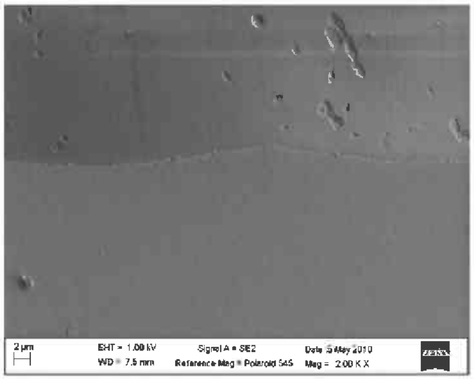


Figure 19

A major challenge shared by dentists and technicians is delivering high strength restoration options without compromising the esthetics demanded by today's dental patients. Traditionally, alloys and oxide ceramics like alumina were used to build high strength core materials and in PFM restorations. However, these core materials present distinct clinical challenges that dentists and technicians have struggled to overcome. First, materials used to fabricate cores generally increase the value and opacity of a restoration when compared to all-ceramics. This is particularly challenging in cases requiring conservative tooth preparations, where the core is placed near the exterior of the restoration. Another challenge associated with high strength cores is that while the core material may offer exceptional mechanical properties, the layering ceramic veneered over it has a much lower flexural strength and is less durable, therefore the risk of chipping or fracturing the layered ceramic increases significantly. Monolithic all-ceramic materials provide highly esthetic results and improved stability, since veneering materials are not required. As a result, they offer distinct advantages over PFM and other core-based restorations.

Through improvements in material science, high-strength all-ceramics like full contour zirconia now offer high strength and enhanced esthetics. Demonstrating exceptional strength (over 900 MPa), full contour zirconia restorations offer improved durability and longevity. Additionally, the optical qualities of the material contribute to restorations with excellent esthetics, while the Diazir unique shading system enables further characterization.

The Diazir shading system allows technicians to enhance esthetics by building in individual characterizations and colors. Provided with five full contour zirconia shades, seven stain pastes, and seven modifier pastes, along with a glaze paste and universal glaze medium, the Diazir shade system represents an alternative to PFM restorations for even the most challenging cases (Figure 12). When the system is used, the base color and translucency of the underlying zirconia core work together with the stains and modifier pastes to impart the ideal hue, chroma, and value within the restoration. As a result, the Diazir Full Contour Zirconia system empowers technicians to provide PFM alternatives with a truly lifelike and natural appearance, one that is indistinguishable from the surrounding dentition.

DIADEM
Precision Technology

Precision Milling

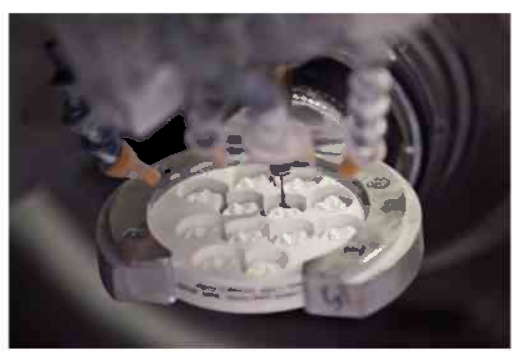
The Benefits of Diazir Full Contour Zirconia:

- Simple stain and glaze technique on pre-colored zirconia eliminates time consuming, unpredictable and hazardous techniques associated with zirconia coloring/dipping liquids
- Ease in fabrication, shorter processing time for higher productivity
- Color throughout zirconia core resembles incisal 1/3 of crown; eliminates "white island" caused during adjustment grinding
- New, low solubility glaze forms a wear-resistant, protective coat and can also be applied to a polished zirconia surface
- High light transmittance for natural esthetics

From the industrial revolution to the computer age, milling machines were created with one focus: to mill solid materials in a nonlaborious manner to achieve extraordinary results. Precision milling is the microbial result yielded from such sophisticated technology. Significant advancements in computer aided design and manufacture (CAD/CAM) technologies and in all-ceramic materials and have led to the development of precision milled dental restorations (PMR).

Industrial 5 axis milling machines offer exceptionally strong and durable monolithic restorations that are highly esthetic alternatives to conventional ceramic and porcelain-fused-to-metal (PFM) restorations. Working with an industrial milling partner allows you access to world-class materials and technologies without large capital investments, maintenance, training and workforce development expenditures.

Diazir Full Contour Zirconia is not just a material. It is a combination of state-of-the art materials, proprietary sintering processes and precision milling. It is uniquely formulated to mimic the beauty of nature along with providing ≥900 MPa of outstanding strength.



KDA-002962
EXHIBIT 101

Precision milled full contour zirconia for outstanding marginal fit.

Keys to Success

Tooth Preparation Guidelines – Appropriate tooth reduction is an essential element to the success of full contour Zirconia restorations. The specific guidelines are outlined figures 20 & 21, below. Due to the high strength of Zirconia, the amount of reduction can be as little as 0.5mm. A feather edge margin can be used, although a chamfer/shoulder margin that is 0.5mm to 1.0mm should be utilized when possible to provide proper support to the cemented restoration. In addition, all line angles should be rounded to aid in the milling process and prevent stresses in the completed restoration.

Minimum Zirconia Thickness - Crowns

Anterior	Crowns
Axial	≥ 0.5 mm
Incisal/Occlusal	≥ 0.5 mm
Connector Dimensions	n/a

Posterior	Crowns
Axial	≥ 0.5 mm
Incisal/Occlusal	≥ 0.5 mm
Connector Dimensions	n/a

Minimum Zirconia Thickness - Bridges

Anterior	3-Unit	≥4 units with max 2 connected pontics	Cantilever with 1 pontic
Axial	≥ 0.5 mm	≥ 0.7 mm	≥ 0.7 mm
Incisal/Occlusal	≥ 0.7 mm	≥ 1.0 mm	≥ 1.0 mm
Connector Dimensions	≥ 7 mm²	≥ 9 mm²	≥ 12 mm²
Posterior			
Axial	≥ 0.5 mm	≥ 0.7 mm	≥ 0.7 mm
Incisal/Occlusal	≥ 0.7 mm	≥ 1.0 mm	≥ 1.0 mm
Connector Dimensions	≥ 9 mm²	≥ 12 mm²	≥ 12 mm²

*In Canada bridge indications are limited to 6 unit bridges with 2 connected pontics.

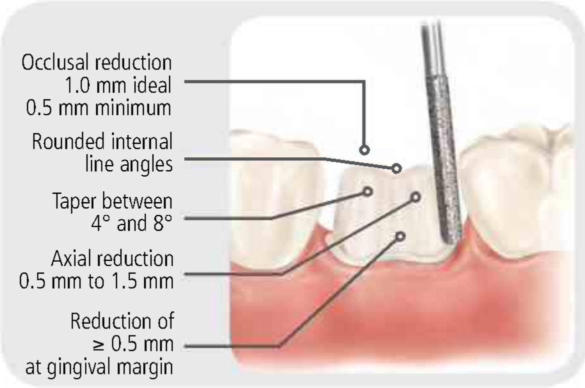


Figure 20

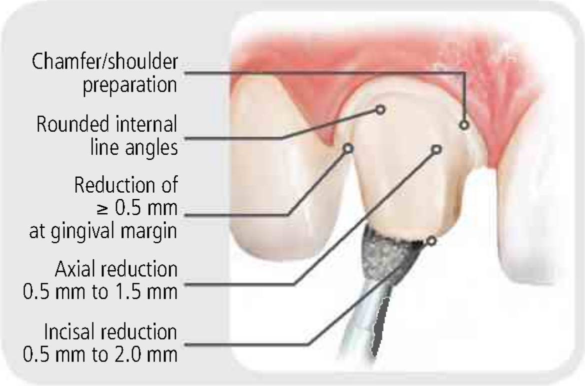


Figure 21

KDA-002963

EXHIBIT 101

Post-Milling Adjustments – After the full contour zirconia restoration is milled and sintered, slight adjustments may be required. Proper design will eliminate the need for excessive surface finishing which can damage the zirconia. Only grinding instruments indicated for zirconia are recommended for adjustments. When grinding, light pressure should be applied, and when possible, water should be used while grinding to cool the material. This prevents excessive heat which may fracture the zirconia. Prior to staining or veneering, rough surfaces due to the milling process should be smoothed with the recommended instruments, then the zirconia surface is sandblasted with 50 micron aluminum oxide at no more than 50 psi. Sandblasting promotes adhesion of the stains and glaze to the restoration as well as allows for easier application of the stains. Once sandblasting is complete, clean the surface by steam cleaning thoroughly, or placing in an ultrasonic cleaner for 15 minutes. The surface must be free of all residues to promote proper adhesion of the stains and glaze.

Staining and Glazing - Using the Diazir staining system will create a polychromatic, life-like restoration. This is achieved by a one or two step stain process depending on the shade, followed by the glazing procedure. It is suggested to apply and fire the glaze in separate steps to easily create a more life-like blend of the enamel and dentin colors. The chart below (Table 3) lists the materials to be used for all Vita A-D and bleach shades.

The first step is the proper selection of the Zirconia shade. The five colors of the Diazir zirconia cover all the Vita A-D shades and give you the correct incisal color for the required final shade. Table 3 also indicates the correct zirconia shade for all Vita A-D and bleach shades.

The next step is applying the appropriate 1st stain paste to achieve the correct basic shade. Mix the stains to a creamy consistency to achieve the best results. Many of the lighter shades only require one stain firing. With a single stain firing technique the 1st stain color is applied and blended into the incisal third until the proper hue, chroma, and value is matched with the target shade. For a two stain technique the first stain color is applied to the entire restoration but should match the incisal portion of the target shade. The second stain is applied in the cervical 2/3 area, blending into the incisal until the hue, chroma, and value matches the target shade. Fire the two stain technique separately to achieve the best blend of color. Many special effects found in natural dentition can be simulated using the modifier pastes. This would be accomplished during the final stain firing.

After all staining is completed the glaze is applied and fired. Mix the glaze paste to a smooth creamy consistency. Apply in a thin even layer and fire according to the firing chart (Table 4). If the result is a rough surface, apply and fire a second layer of glaze. A rough glaze can be the result of too thin a layer of material or glaze that has been diluted too much.

Shade Coordination Chart

Zirconia Shade	001			101							201				301		401		
Coordinates with Vita Shade	0M1	0M2	0M3	A1	B1	B2	C1	D2	D3	D4	A2	A3	A3.5	A4	B3	B4	C2	C3	C4
1st Stain	pink	III	I	I	VII	IV	V	III	II	VII	II	II	II	III	I	I	VII	V	IV
2nd Stain	—	—	—	—	—	I	—	—	VI	VII	—	II	I	II	IV	I	III	III	V

Table 3

Diazir™ Full Contour Zirconia

Precision milled full contour zirconia for outstanding marginal fit.

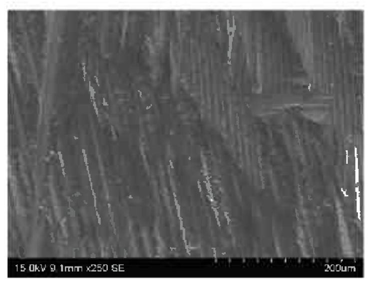
Firing Guidelines –The Diazir system includes a firing chart (Table 4) that details all necessary parameters. Additionally, the firing parameters for staining and glazing are the same, which simplifies the process. After firing, the full contour zirconia restoration should appear smooth and glazed. Slight temperature adjustments may be necessary to benchmark your furnace and get the desired result. If the proper surface texture is not achieved, Diazir Full Contour Zirconia Glaze can be re-applied and re-fired according to the provided parameters.

Firing Parameters
Diazir Full Contour Zirconia Stain & Glaze

	Stain	**Glaze**
Pre-Dry	6 min	6 min
Low Temp	425 °C	800 °F
Heat Rate	55 °C/min	100 °F/min
Vac	FULL	FULL
Vac Start	480 °C	900 °F
Vac Stop	1000 °C	1830 °F
High Temp	1000 °C	1830 °F
Hold	0	0
Cool	0	0

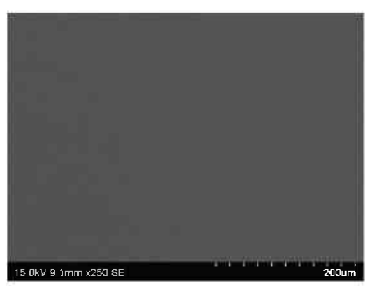
Table 4

Finishing & Polishing – It has been documented that unpolished zirconia is abrasive to the opposing dentition. If adjustments are made by the laboratory technician or dentist after the restoration has been glazed the affected surface must be polished with approved polishing cups and pastes, or re-glazed to ensure optimal surface texture (see Figures 22 & 23). To prevent damaging the restoration surface, only recommended zirconia polishers should be used, including NTI CeraGlaze or Zir-Cut Zirconia Polishers from Axis Dental and Jota Porcelain Polisher by Jota AG. Additionally, specialized zirconia polishers are available from Komet and Brasseler. If polishing paste is required, DiaShine Diamond Polishing Compound (Fine) from VH Technologies is recommended.



Adjusted sintered zirconia
250x magnification

Figure 22



Polished after adjustment
250x magnification
**Axis clinical zirconia polishers*

Figure 22

Designed for Performance
Milled for Perfection.

Introducing **Diazir**™ Full Contour Zirconia Restorations

Exclusively from Diadem Precision Technology!

Not all zirconia restorations are milled the same. While some restorations sacrifice fit and beauty for strength, precision milled Diazir Full Contour Zirconia is uniquely formulated and processed to mimic the beauty of nature along with providing:

- Unsurpassed Fit
- Precision Contacts
- Outstanding Esthetics

Call today to experience the precision and beauty of Diazir!

Diazir™
FULL CONTOUR ZIRCONIA

Contact us today for more information on Diazir Full Contour Zirconia!